WHAT IS CLAIMED IS:

1. A guide catheter apparatus, comprising:

(a) a guide catheter portion comprising a plurality of electroactive polymer actuators disposed along its axial length, said actuators changing guide catheter portion shape based upon received control signals; and

(b) a control unit coupled to said plurality of actuators and sending said control signals to said plurality of actuators.

2. The guide catheter apparatus of claim 1, wherein said electroactive polymer actuators comprise an electroactive polymer selected from the group consisting of polyaniline, polypyrrole, polysulfone, and polyacetylene.

3. The guide catheter apparatus of claim 2, wherein said electroactive polymer actuators comprise polypyrrole.

4. The guide catheter apparatus of claim 1, wherein at least a portion of said actuators are in tension with one another.

5. The guide catheter apparatus of claim 1 wherein said plurality of electroactive polymer actuators are disposed along at least 5% of the fully inserted axial length of the guide catheter portion.

6. The guide catheter apparatus of claim 1, wherein each of said plurality of electroactive polymer actuators comprises (a) an active member portion, (b) a counter-electrode portion and (c) a region comprising an electrolyte disposed between said active member portion and said counter-electrode portion.

7. The guide catheter apparatus of claim 6, wherein said active member portion, said counter-electrode portion and said region comprising an electrolyte are disposed between a substrate layer and a barrier layer.

8. The guide catheter apparatus of claim 7, wherein said substrate layer is in the shape of a tube.

9. The guide catheter apparatus of claim 8, wherein at least a portion of said electroactive polymer actuators are adapted to contract in a direction parallel to an axis of said tube.

10. The guide catheter apparatus of claim 1, wherein said guide catheter portion further comprises a plurality of strain gauges.

11. The guide catheter apparatus of claim 1, wherein said guide catheter portion further comprises a structural element selected from the group consisting of (a) a tubular network comprising at least one metallic filament, (b) a tubular interconnected network of articulable segments, (c) a helical structure comprising at least one metallic filament, and (d) a patterned tubular sheet.

12. The guide catheter apparatus of claim 1, wherein said control signals are sent from said control unit to said actuators over a multiplexed cable.

13. The guide catheter apparatus of claim 1, wherein said control unit comprises a personal computer.

14. The guide catheter apparatus of claim 1, wherein said electroactive polymer actuators are controllable to provide a desired curvature to said guide catheter portion at each of a plurality of loci along the length of said catheter portion.

15. The guide catheter apparatus of claim 1, wherein said control signals correspond to a user selectable shape for said guide catheter portion.

16. The guide catheter apparatus of claim 1, wherein said control unit comprises an electronic memory, and wherein said user selectable shape for said guide catheter portion is stored in said electronic memory.

17. The guide catheter apparatus of claim 1, said control signals are generated using a manual steering device.

18. The guide catheter apparatus of claim 1, wherein said control signals are generated by a shape-generating algorithm within said control unit using medical diagnostic imaging data.

19. The guide catheter apparatus of claim 18, wherein said medical diagnostic imaging data is angiogram data.

20. The guide catheter apparatus of claim 1, wherein said catheter portion comprises a lead module and a plurality of following modules, and wherein said guide catheter portion is adapted to travel in such a way that, when each following module reaches a position previously occupied by said lead module, said actuators cause said each following module to replicate the orientation of said lead module at said position.

21. The guide catheter apparatus of claim 20, wherein position data is provided by a depth gauge or a linear displacement module.

22. The guide catheter apparatus of claim 20, wherein lead module orientation data is provided by strain gauges within said lead module.

23. A method of introducing a guide catheter into a body lumen comprising:

providing a guide catheter apparatus, said guide catheter apparatus comprising: (a) a guide catheter portion comprising a plurality of electroactive polymer actuators disposed along its axial length, said actuators changing guide catheter portion shape based upon received control signals; and (b) a control unit coupled to said plurality of actuators and sending said control signals to said plurality of actuators; and

inserting said guide catheter portion of said guide catheter apparatus into said body lumen while controlling the shape of said guide catheter portion using said control unit.

24. The method of claim 23, further comprising conducting a surgical procedure by inserting an interventional device through said guide catheter portion.

25. The method of claim 23, wherein said actuators are controllable to provide a desired curvature to said guide catheter portion at each of a plurality of loci along the length of said guide catheter portion.

26. The method of claim 23, wherein the shape of said guide catheter portion is selected by an operator from a plurality of user selectable shapes.

27. The method of claim 23, wherein said control signals are generated by an operator using a manual steering device.

28. The method of claim 23, wherein said control signals are generated by a shape-changing algorithm based on medical diagnostic imaging data.

29. The method of claim 28, wherein said medical diagnostic imaging data is angiogram data.

30. The method of claim 23, wherein said catheter portion comprises a lead module and a plurality of following modules, and wherein said guide catheter portion is adapted to travel in such a way that, when each following module reaches a position previously occupied by said lead module, said actuators cause said each following module to replicate the orientation of said lead module at said position.

31. The method of claim 30, wherein position data is provided by a depth gauge or a linear displacement module.

32. The method of claim 30, wherein lead module orientation data is provided by strain gauges disposed in said lead module.

33. The method of claim 23, wherein said guide catheter portion is stiffened upon reaching a location determined by an operator.

34. The method of claim 33, wherein said guide catheter portion is stiffened by placing a plurality of actuators in tension with each other.

35. The guide catheter apparatus of claim 1, wherein said control signals are sent from said control unit to said actuators over a wireless interface.

36. The guide catheter apparatus of claim 1, wherein said plurality of electroactive polymer actuators are disposed along at least 10% of the fully inserted axial length of the guide catheter portion.

37. The guide catheter apparatus of claim 1, wherein said plurality of electroactive polymer actuators are disposed along at least 25% of the fully inserted axial length of the guide catheter portion.

38. The guide catheter apparatus of claim 1, wherein said plurality of electroactive polymer actuators are disposed along at least four centimeters of the guide catheter.

39. The guide catheter apparatus of claim 1 wherein said plurality of electroactive polymer actuators are disposed along at least ten centimeters of the guide catheter.